

VERIFICATION OF TRANSLATION

I, Masao Matsumoto

of 7th/F., M&E Bldg. Ikebukuro, 36-10, Nishi-Ikebukuro 2-Chome,
Toshima-ku, Tokyo, Japan

declare as follows:

1. That I am well acquainted with both the English and Japanese languages, and
2. That the attached document is a true and correct translation made by me to the best of my knowledge and belief of:-

The specification accompanying the Application No. 2000-157205
for a patent made in Japan
filed on May 26, 2000.

March 23, 2005



Masao Matsumoto

PATENT OFFICE
JAPANESE GOVERNMENT

This is to certify that the annexed is a true copy of the following application as filed with this Office.

Dated of Application : May 26, 2000

Application Number : Patent Application No.
2000-157205

Applicant(s) : NEC Corporation

March 9, 2001

Commissioner, Kozo OIKAWA
Patent Office

Certificate No.2001-3017355

[THE NAME OF DOCUMENT] PATENT APPLICATION

[REFERENCE NUMBER] 68501840

[FILING DATE] May 26, 2000

[DESTINATION] DIRECTOR-GENERAL PATENT OFFICE

[IPC CLASSIFICATION] G09C 5/00

[INVENTOR]

[ADDRESS] c/o NEC Corporation, 7-1,
Shiba 5-chome, Minato-ku, Tokyo, Japan

[NAME] Katsuyoshi MASE

[APPLICANT]

[DISCRIMINATION NUMBER] 000004237

[NAME] NEC Corporation

[AGENT]

[DISCRIMINATION NUMBER] 100103090

[PATENT ATTORNEY]

[NAME] Fuyuki IWAKABE

[TELEPHONE NUMBER] 03-3811-3561

[OFFICIAL FEE]

[HOW TO PAY] PREPAYMENT

[NUMBER OF PREPAYMENT LEDGER] 050496

[AMOUNT OF PAYMENT] 21000

[THE LIST OF FILING OBJECT]

[THE NAME OF OBJECT] Specification 1

[THE NAME OF OBJECT] Drawing 1

[THE NAME OF OBJECT] Abstract 1

[NEEDS OF PROOF] NEED

[THE NAME OF DOCUMENT] SPECIFICATION
[TITLE OF THE INVENTION] DIGITAL WATERMARKING DEVICE,
DIGITAL WATERMARK INSERTION METHOD AND DIGITAL WATERMARK
DETECTION METHOD

[CLAIM]

[CLAIM 1] A digital watermarking device to insert the digital watermark information into the digital information, comprises a digital watermark insertion means which inserts, to the digital information, the digital watermark information of the type uniquely specified corresponding to the data held by said digital information.

[CLAIM 2] A digital watermarking device as set forth in Claim 1, wherein

said digital watermark insertion means extracts the time stamp information from the visual data in the digital information, and inserts the digital watermark information of the type uniquely specified corresponding to the time stamp information into the visual data corresponding to the time stamps.

[CLAIM 3] A digital watermarking device as set forth in Claim 2, further comprises a data separation means which separates the digital information into the visual data and the audio data, and a data synthesis means which synthesizes the visual data and the audio data, wherein

said digital watermark insertion means inserts the digital watermark information to the visual data separated

by said data separation means, and

said data synthesis means synthesizes the visual data containing the inserted digital watermark information and the audio data separated by said data separation means.

[CLAIM 4] A digital watermarking device to detect the digital watermark information from the digital information, comprises a digital watermark detection means which detects, from the digital information, the digital watermark information of the type uniquely specified corresponding to the data held by said digital information.

[CLAIM 5] A digital watermarking device as set forth in Claim 4, wherein

said digital watermark detection means extracts the time stamp information from the visual data in the digital information, and detects the digital watermark information of the type uniquely specified corresponding to the time stamp information from the visual data corresponding to the time stamps.

[CLAIM 6] A digital watermarking device as set forth in Claim 5, further comprises a data separation means which separates the digital information into the visual data and the audio data, a display signal generation means which prepares the display signal by synthesizing the visual data with the digital watermark information detected by said digital watermark detection means, and an audio data conversion means which converts the audio data separated by said data separation means

into the analog signal, wherein

said digital watermark detection means detects the digital watermark information from the visual data separated by said data separation means.

[CLAIM 7] A digital watermark insertion method to insert the digital watermark information into the digital information, comprising the step of:

inserting the digital watermark information of the type uniquely specified corresponding to the data held by the digital information to the digital information.

[CLAIM 8] A digital watermark insertion method as set forth in Claim 7, wherein

extracting the time stamp information corresponding to the visual data in the digital information when the digital watermark information of the type uniquely specified corresponding to the data held by the digital information is inserted to the digital information, and

inserting the digital watermark information of the type uniquely specified corresponding to the time stamp information to the visual data corresponding to the time stamps.

[CLAIM 9] A digital watermark detection method to detect the digital watermark information from the digital information, comprising the step of:

detecting the digital watermark information of the type uniquely specified corresponding to the data held by the digital information from the digital information.

[CLAIM 10] A digital information detection method as set forth in Claim 9, wherein,

when the digital watermark information of the type uniquely specified corresponding to the data held by the digital information is detected from the digital information, extracting the time stamp information corresponding to the visual data in the digital information, and detecting the digital watermark information of the type uniquely specified corresponding to the time stamp information from the visual data corresponding to the time stamps.

[DETAILED DESCRIPTION OF THE INVENTION]

[0001]

[FIELD OF THE INVENTION]

The present invention relates to a digital watermarking device, a digital watermark insertion method and a digital watermark detection method.

[0002]

[PRIOR ART]

Digital information can be easily reproduced, and is often copied illegally. Various digital watermarking technologies to insert digital watermark information into the digital information have been proposed so that the copyright holder can claim his/her copyright to the person who copied the information illegally. Devices and methods for digital watermark insertion into the digital information include, for example, the devices and the

methods described in the Japanese Patent Application Laid-open (Kokai) No. 2000-59610 and No. 2000-59730.

[0003]

Fig. 5 is a block diagram showing an configuration example of the device described in the Japanese Patent Application Laid-open (Kokai) No. 2000-59610. In this device, an image input section 54 fetches the image data as the original image. A square division section 55 divides the original image into squares. An information input section 56 inputs the predetermined information to be embedded in the image data and an encoding section 52 embeds such information as the digital watermark information in the image data. Here, the encoding section 52 embeds the digital watermark information to every square (every block) divided. A control section 50 makes various controls. According to the device shown in Fig. 5, the digital watermark information is embedded to every piece of divided squares after division of the image data into squares, and the digital watermark information can be detected even when a part of the image data is cut off.

[0004]

Fig. 6 shows an image stream to record the digital watermark information by the digital watermark information recording method as described in the Japanese Patent Application Laid-open (Kokai) No. 2000-59730. According to this recording method, the reference information to detect the digital watermark information is recorded in every

frame containing the time information in the image stream. Here, the reference information is recorded so that it is contained in the encoded information obtained by encoding of the image. The position to record the reference information is uniquely specified by the time information. By this method, the reference information recording position varies frame by frame and the digital watermark information can be taken out by detecting the reference signal even when a part of the image information is masked.

[0005]

[PROBLEMS TO BE SOLVED BY THE INVENTION]

Digital watermark information to be inserted into the image data includes, for example, the information about the owner of the image data and the information about whether or not to permit reproduction of the image data. When many types of digital watermark information are inserted to the image data, it will be difficult for a third party without authority for data utilization to analyze the digital watermark information. Therefore, to prevent analysis by a third party, it is preferable to insert as many types of information as possible for the digital watermark information.

[0006]

Some types of inserted digital watermark information may deteriorate the image data. By inserting several types of digital watermark information, deterioration extent of the image data by a certain type

of digital watermark information can be reduced. From this viewpoint, too, it is preferable to insert several types of information as the digital watermark information.

[0007]

It is also preferable that the number of types of the digital watermark information to be inserted is highly flexible. Note that, however, the scale of the device for insertion and detection of the digital watermark is preferably small.

[0008]

According to the device as described in the Japanese Patent Application Laid-open No. 2000-59610, an image is divided into sections and digital watermark information is assigned to each section so that increased types of digital watermark information are inserted. However, because the digital watermark is embedded into the divided images, sufficient amount of digital watermark information cannot be embedded when the original image is not large enough over a certain size. In addition, when a divided section is lacking, the digital watermark information embedded to that section may not be obtained properly. The digital watermark information recording method as described in the Japanese Patent Application Laid-open No. 2000-59730 enables the digital watermark information to be taken out even when a part of the image information is masked, but it does not disclose a method to increase the types of digital watermark information to

be recorded.

[0009]

It is an object of the present invention to provide a digital watermarking device which inserts several types of digital watermark information into the digital information and detects the digital watermark information from the digital information with several types of digital watermark information inserted as well as to provide a digital watermark insertion method and a digital watermark detection method.

[0010]

[MEANS TO SOLVE THE PROBLEM]

According to the invention, a digital watermarking device to insert the digital watermark information into the digital information comprises a digital watermark insertion means which inserts, to the digital information, the digital watermark information of the type uniquely specified corresponding to the data held by the digital information.

[0011]

In this case, the digital watermark insertion means extracts the time stamp information from the visual data in the digital information, and inserts the digital watermark information of the type uniquely specified corresponding to the time stamp information into the visual data corresponding to the time stamps. According to the digital watermarking device as described above, the

digital watermark information is determined with utilizing the time stamp originally held by the digital information and the scale of the device can be kept small.

[0012]

In the preferred construction, the digital watermarking device further comprises a data separation means which separates the digital information into the visual data and the audio data, and a data synthesis means which synthesizes the visual data and the audio data, wherein the digital watermark insertion means inserts the digital watermark information to the visual data separated by the data separation means, and the data synthesis means synthesizes the visual data containing the inserted digital watermark information and the audio data separated by the data separation means. According to the digital watermarking device as described above, several types of digital watermark information can be inserted to the digital information containing the visual data and audio data.

[0013]

According to the invention, a digital watermarking device to detect the digital watermark information from the digital information, comprises a digital watermark detection means which detects, from the digital information, the digital watermark information of the type uniquely specified corresponding to the data held by the digital information.

[0014]

In this case, the digital watermark detection means extracts the time stamp information from the visual data in the digital information, and detects the digital watermark information of the type uniquely specified corresponding to the time stamp information from the visual data corresponding to the time stamps. According to the digital watermarking device as described above, the digital watermark information is determined with utilizing the time stamp originally held by the digital information and the scale of the device can be kept small.

[0015]

In the preferred construction, the digital watermarking device further comprises a data separation means which separates the digital information into the visual data and the audio data, a display signal generation means which prepares the display signal by synthesizing the visual data with the digital watermark information detected by the digital watermark detection means, and an audio data conversion means which converts the audio data separated by the data separation means into the analog signal, wherein the digital watermark detection means detects the digital watermark information from the visual data separated by the data separation means. According to the digital watermarking device as described above, the digital watermark information can be checked while the visual and audio data in the digital information

are played.

[0016]

According to the invention, a digital watermark insertion method to insert the digital watermark information into the digital information, comprising the step of inserting the digital watermark information of the type uniquely specified corresponding to the data held by the digital information to the digital information.

[0017]

Also, in the digital watermark insertion method, extracting the time stamp information corresponding to the visual data in the digital information when the digital watermark information of the type uniquely specified corresponding to the data held by the digital information is inserted to the digital information, and inserting the digital watermark information of the type uniquely specified corresponding to the time stamp information to the visual data corresponding to the time stamps.

[0018]

According to the invention, a digital watermark detection method to detect the digital watermark information from the digital information, comprising the step of detecting the digital watermark information of the type uniquely specified corresponding to the data held by the digital information from the digital information.

[0019]

Also, in the digital information detection method,

when the digital watermark information of the type uniquely specified corresponding to the data held by the digital information is detected from the digital information, extracting the time stamp information corresponding to the visual data in the digital information, and detecting the digital watermark information of the type uniquely specified corresponding to the time stamp information from the visual data corresponding to the time stamps.

[0020]

[THE EMBODIED CONFIGURATION OF THE INVENTION]

Fig. 1 is a block diagram showing an embodiment of a digital watermarking device according to the present invention. A file input circuit 1 inputs the visual/audio data file containing the synthesized visual and audio data. Here, the file input circuit 1 inputs the compressed visual/audio data file. A Demux circuit 2 separates the input visual/audio data into the visual data and the audio data. Fig. 2 shows an example of the stream in the separated visual data. The visual data stream contains frames which consist of time stamps and compressed visual data. The separated audio data also has a similar stream.

[0021]

A visual time stamp detection circuit 3 extracts the time stamps from the visual data. For detection of the digital watermark information, the visual time stamp detection circuit 3 outputs the time stamps and the visual

data to a digital watermark detection circuit 4 and outputs the time stamps to an image decoding circuit 7. For insertion of the digital watermark information, the time stamps and the visual data are output to a digital watermark insertion circuit 8. The arrows shown in broken lines in the figure show the connections for input and output of the time stamps.

[0022]

The digital watermark detection circuit 4 specifies the type of the digital watermark information to be detected corresponding to the time stamps and detects the specified digital watermark information from the input visual data. The digital watermark detection circuit 4 outputs the detected digital watermark information to a result display circuit 5 and outputs the visual data to the image decoding circuit 7.

[0023]

Based on the digital watermark information input from the digital watermark detection circuit 40, the result display circuit 5 prepares the display data for the information and outputs the display data for the digital watermark information to an image output circuit 6. The image decoding circuit 7 receives the compressed visual data from the digital watermark detection circuit 4 and restores such data, and outputs the visual data to the image output circuit 6 according to the times given by the time stamps input from the visual time stamp detection

circuit 3. The image output circuit 6 synthesizes the display data input from the result display circuit 5 and the visual data input from the image decoding circuit 7 and prepares the display signal.

[0024]

The digital watermark insertion circuit 8 specifies the type of the digital watermark information to be inserted according to the time stamps, and inserts the specified digital watermark information to the input visual data. The digital watermark insertion circuit 80 outputs the visual data with the digital watermark information inserted to a mixer circuit 9.

[0025]

The mixer circuit 9 synthesizes the audio data input from an audio time stamp detection circuit 11 to be described later and the visual data input from the digital watermark insertion circuit 8. The file output circuit 10 stores the visual/audio data file synthesized by the mixer circuit 9.

[0026]

The audio time stamp detection circuit 11 extracts the time stamps from the audio data and, when detecting the digital watermark information, outputs the time stamps and the audio data to an audio decoding circuit 12 and, when inserting the digital watermark information, outputs the audio data to the mixer circuit 9. The audio decoding circuit 12 restores the compressed audio data and outputs

the data to an audio output circuit 13 according to the times indicated by the time stamps. The audio output circuit 13 converts the audio data restored by the audio decoding circuit 12 into the analog signal.

[0027]

Next, the operation of the digital watermarking device having the above configuration will be described below.

Firstly, the operation when the visual/audio data without any digital watermark information inserted is input to the digital watermarking device, which inserts the digital watermark information to the data.

[0028]

The visual/audio data without any digital watermark information inserted is input to the file input circuit 1, which outputs the data to the Demux circuit 2. Note that this data is compressed. The Demux circuit 2 separates the visual/audio data into the visual data and the audio data. Here, in the visual data stream as shown in Fig. 2, the visual data in each frame does not contain the digital watermark information. The Demux circuit 2 outputs the separated visual data and the audio data to the visual time stamp detection circuit 3 and the audio time stamp detection circuit 11 respectively.

[0029]

The visual time stamp detection circuit 3 extracts the time stamp information from the visual data and

outputs it to the digital watermark insertion circuit 8. In addition, the visual time stamp detection circuit 3 outputs the input visual data as it is to the digital watermark insertion circuit 8.

[0030]

The digital watermark insertion circuit 8 uniquely specifies the type of the digital watermark information to be inserted corresponding to the input time stamp and inserts the digital watermark information of the applicable type to the visual data. For example, if the "Information about the owner of the visual/audio data file" is specified as the type of information to be inserted corresponding to a time stamp, the "Owner identification No." or the like will be inserted into the visual data corresponding to that time stamp. If the "Information about whether or not to permit reproduction of the visual/audio data file" is specified for a time stamp, the information "Reproducible" or "Not reproducible" or the like will be inserted.

[0031]

The digital watermark insertion circuit 8 executes calculation using the time stamps and specifies the type of the digital watermark information according to the calculation results. For example, corresponding to the time stamp i , the digital watermark information circuit 8 calculates $\alpha(i)$ as the remainder of the formula $(A * i + B)/C$ and specifies the type of the digital watermark

information corresponding to $\alpha(i)$. Here, the digital watermark insertion circuit 8 associates the values of $\alpha(i)$ and the types of the digital watermark information in advance and specifies the type corresponding to $\alpha(i)$ as follows: "Information about the owner" for $\alpha(i) = 1$ and "Information whether or not to permit reproduction" for $\alpha(i) = 2$, for example. In this example, the value $\alpha(i)$ is determined as the remainder of the division using C, the digital watermark information of C types can be specified by change of the time stamp i. The calculation of $\alpha(i)$ here is just an example and other calculation methods may be used.

[0032]

In addition, the digital watermark insertion circuit 8 stores the information to be inserted as various digital watermark information ("Owner ID No.", "Reproducible", "Not reproducible" and so on) in advance and inserts the information into the visual data corresponding to the specified type.

[0033]

The digital watermark insertion circuit 8 outputs the visual data with the digital watermark information inserted to the mixer circuit 9.

[0034]

Further, the audio time stamp detection circuit 11 outputs the audio data input from the Demux circuit 2 as it is to the mixer circuit 9.

[0035]

The mixer circuit 9 synthesizes the visual data with the digital watermark information inserted and the audio data and outputs the synthesized data to the file output circuit 10. The file output circuit 10 stores the data synthesized by the mixer circuit 9 as the visual/audio data file.

[0036]

By thus inserting the digital watermark information, various types of digital watermark information corresponding to the time stamp i are inserted to the visual data in the stream. With several types of digital watermark information inserted, analysis of the digital watermark information by a third party can be prevented. In addition, even when a particular type of digital watermark information deteriorates the image data, insertion of several types of digital watermark information can reduce the extent of such deterioration.

[0037]

Next, the operation when the visual/audio data with the digital watermark information inserted is input to the digital watermarking device, which detects the digital watermark information from such data will be described below.

[0038]

The file input circuit 1 receives the input of the visual/audio data with the digital watermark information

inserted and then outputs such data to the Demux circuit 2. Note that this data is compressed. The Demux circuit 2 separates the visual/audio data into the visual data and the audio data. Here, in the visual data stream as shown in Fig. 2, the visual data in each frame contains the digital watermark information. The Demux circuit 2 outputs the separated visual data and the audio data to the visual time stamp detection circuit 3 and the audio time stamp detection circuit 11 respectively.

[0039]

The visual time stamp detection circuit 3 extracts the time stamp information from the visual data and outputs it to the digital watermark detection circuit 4 and the image decoding circuit 7. In addition, the visual time stamp detection circuit 3 outputs the input visual data as it is to the digital watermark detection circuit 4.

[0040]

The digital watermark detection circuit 4 specifies the type of the digital watermark information to be detected corresponding to the input time stamp and detects the digital watermark information of the applicable type from the visual data. For example, if the "Information about the owner of the visual/audio data file" is specified as the type of information to be detected, "Owner identification No." or the like will be detected from the visual data corresponding to the time stamp. If the "Information about whether or not to permit

reproduction of the visual/audio data file" is specified for the time stamp, the information "Reproducible" or "Not reproducible" will be detected.

[0041]

The digital watermark detection circuit 4 executes calculation similar to that executed in specification of the digital watermark information by the digital watermark insertion circuit 8, and thereby identifies the type of the information from the time stamp. Thus, if the digital watermark insertion circuit 8 inserts the "Information about the owner" into the visual data corresponding to a certain time stamp, the digital watermark detection circuit 4 will detect the "Information about the owner" from the visual data.

[0042]

The digital watermark detection circuit 4 outputs the detection result of the digital watermark information (information types and the applicable information) to the result display circuit 5. For example, if the "Owner identification No." is detected as the "Information about the owner", the type "Information about the owner" and the detected identification No. will be output to the result display circuit 5. The result display circuit 5 converts the digital watermark information type and the information itself input from the digital watermark detection circuit 4 into display data to be displayed as characters and images and outputs such data to the image output circuit 6.

[0043]

The digital watermark detection circuit 4 outputs the visual data to the image decoding circuit 7. The image decoding circuit 7 restores the compressed visual data input from the digital watermark detection circuit 4. Then, corresponding to the times given by the time stamps input from the time stamp detection circuit 3, the restored visual data is output to the image output circuit 6. The image output circuit 6 synthesizes such visual data and the digital watermark information display data input from the result display circuit 5 and prepares the display signal. The display unit (not shown in the figures) uses such display signal to display the visual data and the digital watermark information.

[0044]

The audio time stamp detection circuit 11 extracts the time stamp information from the audio data input from the Demux circuit 2 and outputs such information to the audio decoding circuit 12. The input audio data is also output to the audio decoding circuit 12. The audio decoding circuit 12 restores the compressed audio data input from the audio time stamp detection circuit 11. Then, corresponding to the times given by the time stamps, the restored audio data is output to the audio output circuit 13. The audio output circuit 13 converts the input audio data into the analog signal. The speaker or the like (not shown in the figures) uses the audio signal after

conversion to reproduce the audio data.

[0045]

By detecting the digital watermark information as described above, several types of digital watermark information inserted to the visual data corresponding to the time stamps can be detected.

[0046]

Since the digital watermarking device as shown in Fig. 1 uses the time stamps originally held by the visual/audio data to specify the types of the information to be inserted or detected, the scale of the device can be kept small. By changing the calculation method of α (i) to associate the time stamps and the types of the digital watermark information, the number of digital watermark information types to be inserted or detected can be increased.

[0047]

In the above embodiment, when the digital watermarking device inserts the digital watermark information into the visual/audio data without any digital watermark information inserted, the display signal may be prepared by the digital watermark detection circuit 4, the image decoding circuit 7 and the image output device 6. Further, the restored audio data may be converted into the analog signal by the audio decoding circuit 12 and the audio output circuit 13. With the display signal prepared and the audio data converted into the analog signal,

visual/audio output from the display unit and the speaker or the like can be achieved at the same time as the insertion of the digital watermark information.

[0048]

Though the "Information about the owner of the visual/audio data file" and the "Information about whether or not to permit reproduction of the visual/audio data file" are shown as examples of the digital watermark information types in the above embodiment, the types of the digital watermark information are not limited to them.

[0049]

Next, the another embodiment of the present invention will be described below.

Figs. 3 and 4 show block diagrams showing other embodiments of the present invention. The digital watermarking device as shown in Fig. 3 is a device to insert the digital watermark information into the visual/audio data without any digital watermark information inserted. However, it does not detect any digital watermark information from the visual/audio data with the digital watermark information inserted. The circuits of the digital watermarking device as shown in Fig. 3 are similar to the corresponding circuits shown in Fig. 1. Therefore, the operation to insert the digital watermark information to the visual/audio data is the same as that by the digital watermarking device according to the first embodiment above shown in Fig. 1. Note that,

however, the digital watermarking device in this embodiment is not provided with an image decoding circuit 7, an audio decoding circuit 12 and so on and does not output visual/audio data from the display unit and the speaker or the like with inserting the digital watermark information.

[0050]

The digital watermarking device as shown in Fig. 4 detects the digital watermark information from the visual/audio data with the digital watermark information inserted. Note that, however, it does not insert any digital watermark information to the visual/audio data without any digital watermark information inserted. The circuits of the digital watermarking device as shown in Fig. 4 are similar to the corresponding circuits in the first embodiment as shown in Fig. 1. Therefore, the operation to detect the digital watermark information from the visual/audio data is the same as that by the digital watermarking device according to the first embodiment shown in Fig. 1. The digital watermarking device shown in Fig. 4 detects the digital watermarking information inserted by the digital watermarking device as shown in Fig. 3. However, the digital watermark insertion circuit 8 and the digital watermark detection circuit 4 need to make the same calculation when they specify the type of the information corresponding to the time stamps.

[0051]

[THE EFFECT OF THE INVENTION]

According to the digital watermarking device and the digital watermark insertion method of the present invention, the digital watermark information of the type uniquely specified corresponding to the data held by the digital information into the digital information. Thus, several types of digital watermark information can be inserted corresponding to the data in the digital information and thereby analysis of the digital watermark information by a third party can be prevented. Further, the image deterioration which may be caused by a particular type of digital watermark information can be reduced.

[0052]

Further, according to the digital watermarking device and the digital watermark detection method of the present invention, the digital watermark information of the types uniquely specified according to the data held by the digital information is detected from the digital information. Thus, several types of the digital watermark information inserted can be detected.

[BRIEF DESCRIPTION OF THE DRAWINGS]

[Fig. 1] A block diagram to show an embodiment of a digital watermarking device according to the present invention.

[Fig. 2] An explanatory view to illustrate an

example of visual data stream.

[Fig. 3] A block diagram to show another embodiment of the present invention.

[Fig. 4] A block diagram to show still another embodiment of the present invention.

[Fig. 5] A block diagram to show an example of the configuration of a conventional digital watermarking device.

[Fig. 6] An explanatory view to illustrate the stream of data to which the digital watermark information is inserted according to the conventional method.

[THE DESCRIPTION OF THE NUMERALS]

- 1 file input circuit
- 2 Demux circuit
- 3 visual time stamp detection circuit
- 4 digital watermark detection circuit
- 5 result display circuit
- 6 image output circuit
- 7 image decoding circuit
- 8 digital watermark insertion circuit
- 9 mixer circuit
- 10 file output circuit
- 11 audio time stamp detection circuit
- 12 audio decoding circuit
- 13 audio output circuit

[THE NAME OF DOCUMENT]

ABSTRACT

[ABSTRACT]

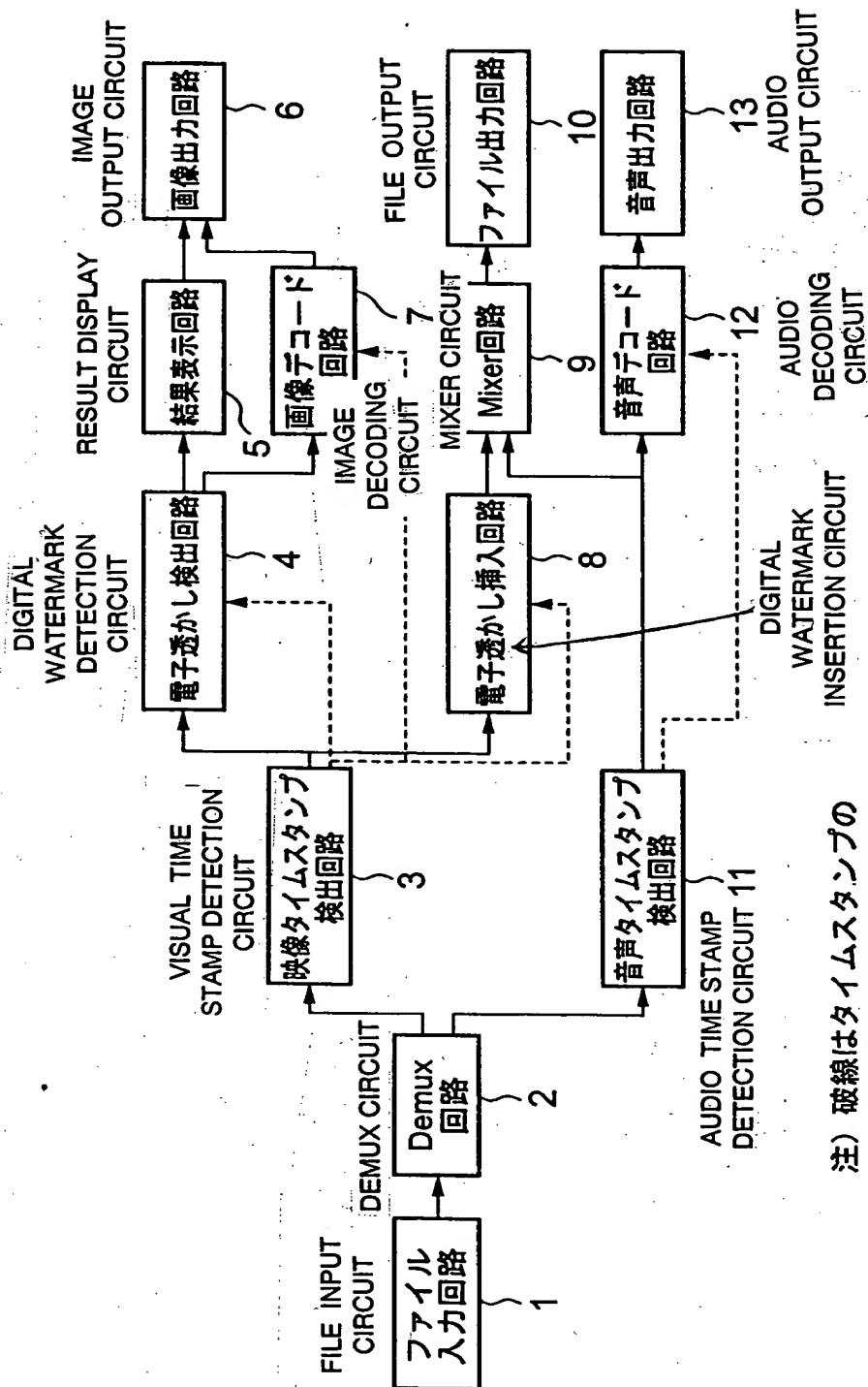
[OBJECT] The present invention to provide a digital watermarking device which inserts several types of digital watermark information into the digital information or detects the digital watermark information from the digital information with several types of digital watermark information inserted.

[CONSTITUTION] When inserting several types of digital watermark information into the digital information, the visual time stamp detection circuit 3 extracts the time stamps corresponding to the visual data in the visual data stream and the digital watermark insertion circuit 8 specifies the types of the digital watermark information to be inserted corresponding to the extracted time stamps and inserts the digital watermark information of the applicable types into the visual data so that such information is synthesized with the audio data by the mixer circuit 9. When the digital watermark information is detected from the digital information, the digital watermark detection circuit 4 specifies the types of the digital watermark information to be detected corresponding to the extracted time stamps and detects the digital watermark information. The display data is generated by synthesizing the visual data with the detected digital watermark information.

[SELECTED DRAWING]

Fig. 1

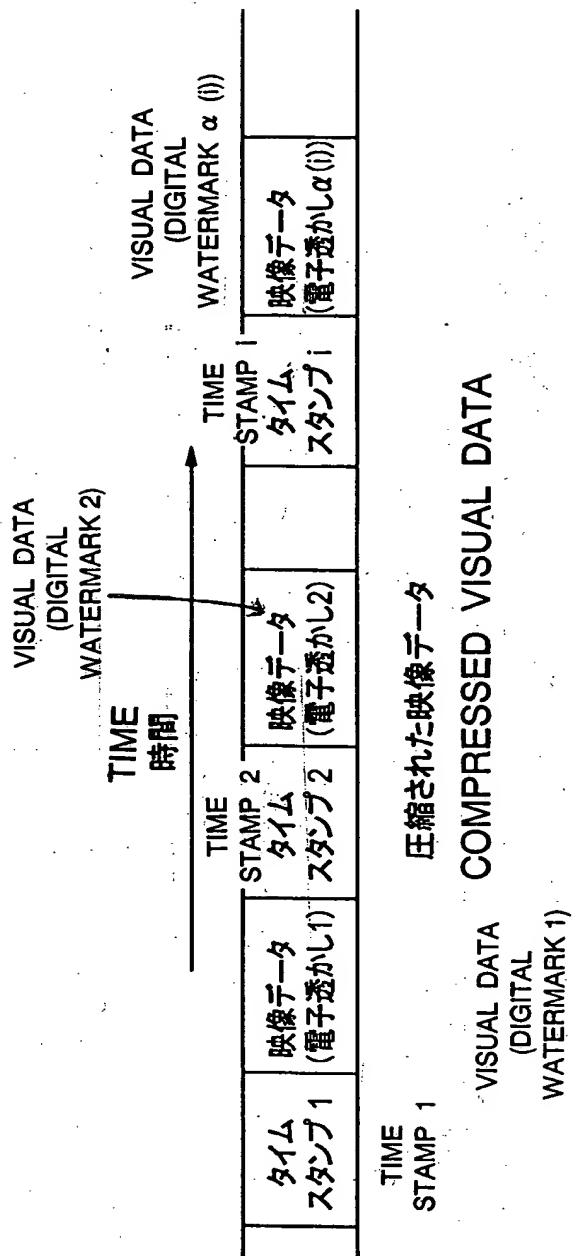
【図 1】 **FIG. 1**



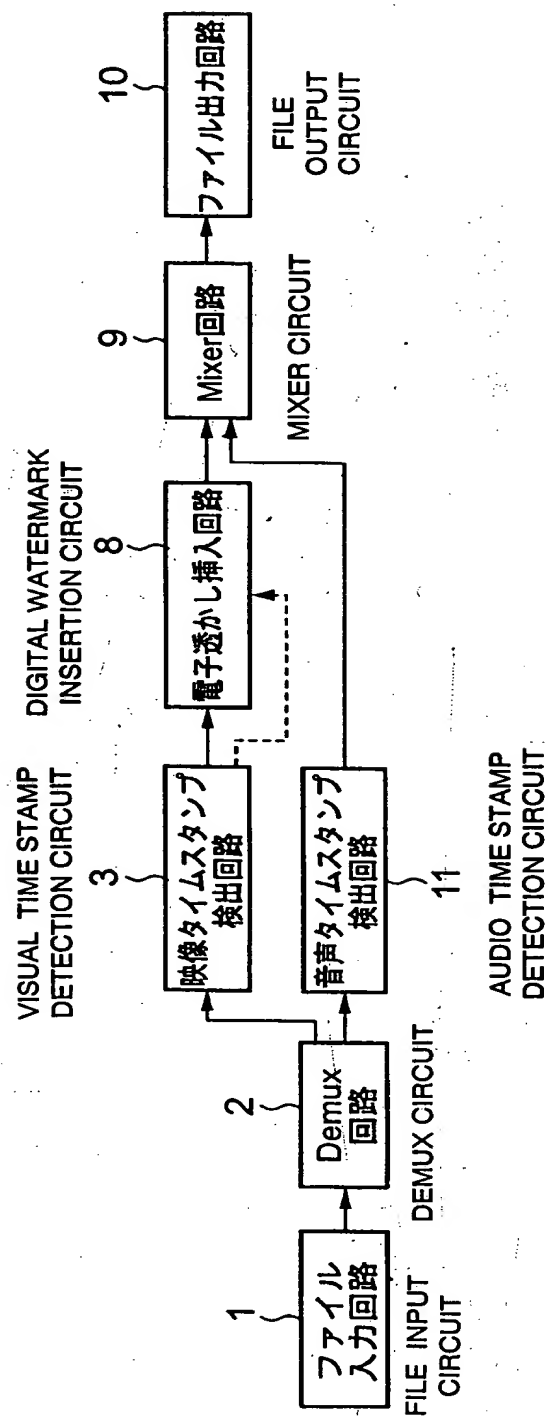
注) 破線はタイムスタンプの
入出力を行う結線を示す。

NOTE) BROKEN LINES SHOW CONNECTIONS
FOR INPUT/OUTPUT OF TIME STAMPS.

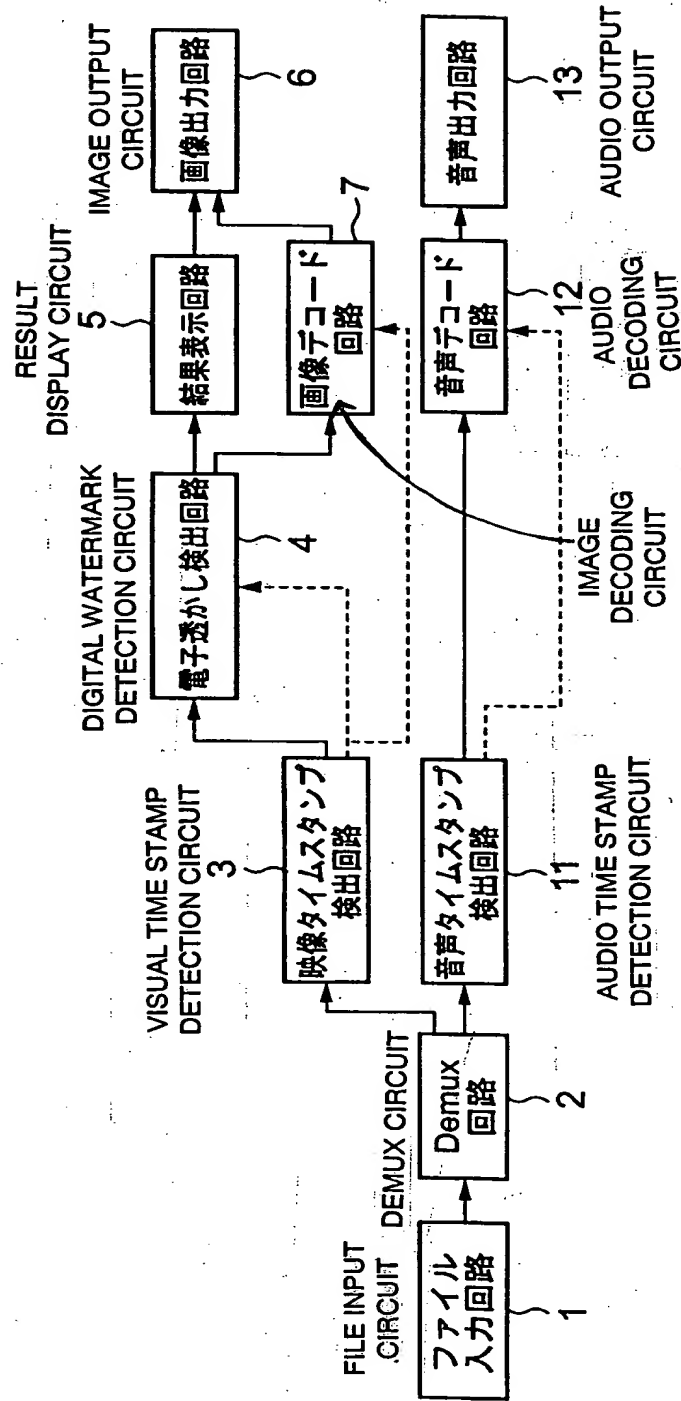
【図2】 FIG. 2



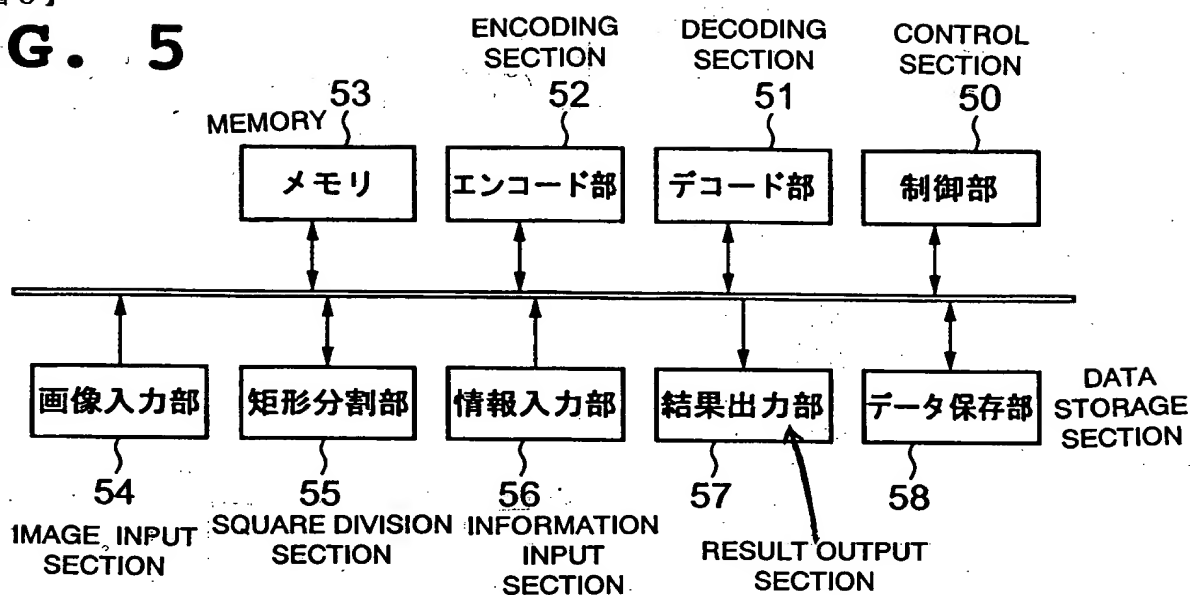
【図 3】 FIG. 3



【図4】 FIG. 4



【図5】
FIG. 5



【図6】 **FIG. 6**

